WHAT IS CLAIMED IS:

1. A quadrature mixer circuit comprising:

an input terminal;

a voltage-current converter which converts the voltage of a signal from said input terminal into signal current;

a DC current source which supplies a bias current to said voltage-current converter;

a current divider which outputs a first output current and a second output current which are two substantially equal halves into which output current of said voltage-current converter is divided;

a local signal oscillator;

a 90° phase shifter which outputs a local signal whose phase is substantially 90 degrees ahead or behind the phase of a local signal from said local signal oscillator;

a first current switch circuit which switches on/off the first output current from said current divider at timing of the local signal from said local signal oscillator;

a first current-voltage converter which converts signal current output from said first current switch circuit into a voltage signal;

a second current switch circuit which switches on/off the second output current from said current divider at timing of the local signal output from said 90° phase shifter; and

a second current-voltage converter which converts

signal current output from said second current switch circuit into a voltage signal,

wherein said current divider is arranged to output the first output current and the second output current, making the amplitude of output voltage of the first output current different from the amplitude of output voltage of the second output current.

2. The quadrature mixer circuit as recited in claim 1, wherein:

a bias current to be supplied to said voltage-current converter is equal to or more than the sum of a bias current to be supplied to said first current switch circuit and a bias current to be supplied to said second current switch circuit.

3. The quadrature mixer circuit as recited in claim 1, wherein:

said current divider includes resistors.

4. The quadrature mixer circuit as recited in claim 1, wherein:

said current divider includes transistors.

5. A quadrature mixer circuit comprising:

an input terminal;

a divider which divides a signal from said input terminal into substantially equal two parts, a first output

signal and a second output signal;

a first voltage-current converter to which a bias current is supplied from a first DC source and which converts the voltage of the first output signal from said divider into signal current;

a second voltage-current converter to which a bias current is supplied from a second DC source and which converts the voltage of the second output signal from said divider into signal current;

a local signal oscillator;

a 90° phase shifter which outputs a local signal whose phase is substantially 90 degrees ahead or behind the phase of a local signal from said local signal oscillator;

a first current switch circuit which switches on/off current output from said first voltage-current converter at timing of the local signal from said local signal oscillator;

a first current-voltage converter which converts current output from said first current switch circuit into a voltage signal;

a second current switch circuit which switches on/off current output from said second voltage-current converter at timing of the local signal output from said 90° phase shifter; and

a second current-voltage converter which converts current output from said second current switch circuit into a voltage signal,

wherein said quadrature mixer circuit includes an

attenuator which attenuates signal current or voltage between a current output terminal of said first voltage-current converter and a current output terminal of said second voltage-current converter.

6. The quadrature mixer circuit as recited in claim 5, wherein:

the bias current to be supplied to said first voltage-current converter is equal to or more than a bias current to be supplied to said first current switch circuit, and

the bias current to be supplied to said second voltage-current converter is equal to or more than a bias current to be supplied to said second current switch circuit.

7. The quadrature mixer circuit as recited in claim 5, wherein:

said attenuator includes a resistor.

8. A mobile terminal characterized by using the quadrature mixer circuit as recited in claim 1.

9. A semiconductor integrated circuit for RF communication in which a Gilbert cell type quadrature mixer circuit is built, said quadrature mixer circuit comprising:

a first differential circuit which receives an RF received signal voltage or an IF received signal voltage

converted from the RF received signal voltage and converts the signal voltage into first and second RF received signal currents with 180 degree phase difference or first and second IF received signal currents with 180 degree phase difference;

a local signal oscillator;

a 90° phase shifter which outputs a local signal whose phase is 90 degrees ahead or behind the phase of a local signal from the local signal oscillator;

a second differential circuit which has a first current input terminal through which current is input, receives the local signal from said local signal oscillator, switches on/off the current input through said first current input terminal at timing of said local signal oscillator, and converts the input current into first and second I output signal currents with 180 degree phase difference;

a third differential circuit which has a second current input terminal through which current is input, receives the local signal from said local signal oscillator, switches on/off the current input through said second current input terminal at timing of 180 degree phase difference from said local signal oscillator, and converts the input current into third and fourth I output signal currents with 180 degree phase difference;

a fourth differential circuit which has a third current input terminal through which current is input, receives the local signal output from said 90° phase shifter,

switches on/off the current input through said third current input terminal at timing of the local signal output from said 90° phase shifter, and converts the input current into first and second Q output signal currents with 180 degree phase difference;

a fifth differential circuit which has a fourth current input terminal through which current is input, receives the local signal output from said 90° phase shifter, switches on/off the current input through said fourth current input terminal at timing of 180 degree phase difference from the local signal output from said 90° phase shifter, and converts the input current into third and fourth Q output signal currents with 180 degree phase difference;

a first I signal current addition and coupling point at which said first I output signal current and said third I output signal current are added and coupled and a resultant fifth I signal current is output;

a second I signal current addition and coupling point at which said second I output signal current and said fourth I output signal current are added and coupled and a resultant sixth I signal current is output;

a first Q signal current addition and coupling point at which said first Q output signal current and said third Q output signal current are added and coupled and a resultant fifth Q signal current is output; and

a second Q signal current addition and coupling point at which said second Q output signal current and said fourth

Q output signal current are added and coupled and a resultant sixth Q signal current is output;

wherein:

the first RF received signal current or first IF received signal current from said first differential circuit is routed through a first voltage dropping element to said first current input terminal and routed through a second voltage dropping element having equal impedance to the impedance of the first voltage dropping element to said third current input terminal; and

the second RF received signal current or second IF received signal current from said first differential circuit is routed through a third voltage dropping element having equal impedance to the impedance of said first and second voltage dropping elements to said second current input terminal and routed through a fourth voltage dropping element having equal impedance to the impedance of said first, second, and third voltage dropping elements to said fourth current input terminal.

10. A semiconductor integrated circuit for RF communication in which a Gilbert cell type quadrature mixer circuit is built, said quadrature mixer circuit comprising:

a first differential circuit which receives an RF received signal voltage or an IF received signal voltage converted from the RF received signal voltage and converts the signal voltage into first and second RF received signal currents with 180 degree phase difference or first and

second IF received signal currents with 180 degree phase difference;

a sixth differential circuit which has structure identical to the structure of the first differential circuit, receives said RF received signal voltage or said IF received signal voltage, and converts the signal voltage into third and fourth RF received signal currents with 180 degree phase difference or third and fourth IF received signal currents with 180 degree phase difference;

a local signal oscillator;

a 90° phase shifter which outputs a local signal whose phase is 90 degrees ahead or behind the phase of a local signal from the local signal oscillator;

a second differential circuit which has a first current input terminal through which current is input, receives the local signal from said local signal oscillator, switches on/off the current input through said first current input terminal at timing of said local signal oscillator, and converts the input current into first and second I output signal currents with 180 degree phase difference;

a third differential circuit which has a second current input terminal through which current is input, receives the local signal from said local signal oscillator, switches on/off the current input through said second current input terminal at timing of 180 degree phase difference from said local signal oscillator, and converts the input current into third and fourth I output signal

currents with 180 degree phase difference;

a fourth differential circuit which has a third current input terminal through which current is input, receives the local signal output from said 90° phase shifter, switches on/off the current input through said third current input terminal at timing of the local signal output from said 90° phase shifter, and converts the input current into first and second Q output signal currents with 180 degree phase difference;

a fifth differential circuit which has a fourth current input terminal through which current is input, receives the local signal output from said 90° phase shifter, switches on/off the current input through said fourth current input terminal at timing of 180 degree phase difference from the local signal output from said 90° phase shifter, and converts the input current into third and fourth Q output signal currents with 180 degree phase difference;

a first I signal current addition and coupling point at which said first I output signal current and said third I output signal current are added and coupled and a resultant fifth I signal current is output;

a second I signal current addition and coupling point at which said second I output signal current and said fourth I output signal current are added and coupled and a resultant sixth I signal current is output;

a first Q signal current addition and coupling point at which said first Q output signal current and said third

Q output signal current are added and coupled and a resultant fifth Q signal current is output; and

a second Q signal current addition and coupling point at which said second Q output signal current and said fourth Q output signal current are added and coupled and a resultant sixth Q signal current is output;

wherein:

the first RF received signal current or first IF received signal current from said first differential circuit is routed to said first current input terminal;

the second RF received signal current or second IF received signal current from said first differential circuit is routed to said second current input terminal;

the third RF received signal current or third IF received signal current from said sixth differential circuit is routed to said third current input terminal;

the fourth RF received signal current or fourth IF received signal current from said sixth differential circuit is routed to said fourth current input terminal;

said first current input terminal is connected via a first voltage dropping element to said third current input terminal; and

said second current input terminal is connected via a second voltage dropping element having equal impedance to the impedance of said first voltage dropping element to said fourth current input terminal.

11. The semiconductor integrated circuit for RF

communication as recited in claim 10, wherein:

the sum of the operating currents of said first and sixth differential circuits diminishes so as to be approximately equal to the operating current of the first differential circuit included in the semiconductor integrated circuit as recited in claim 9.

12. The semiconductor integrated circuit for RF communication as recited in claim 9, wherein:

said first to fourth voltage dropping elements are made, using a polycrystalline silicon layer formed on an insulating layer on the surface of a silicon substrate.

13. The semiconductor integrated circuit for RF communication as recited in claim 10, wherein:

said first and second voltage dropping elements are made, using the polycrystalline silicon layer formed on the insulating layer on the surface of the silicon substrate.

14. The semiconductor integrated circuit for RF communication as recited in claim 9, wherein:

said first to fourth voltage dropping elements are made, using metal wiring layers formed on the insulating layer on the surface of the silicon substrate and shaped into a meandering pattern shape.

15. The semiconductor integrated circuit for RF communication as recited in claim 10, wherein:

said first and second voltage dropping elements are made, using the metal wiring layers formed on the insulating layer on the surface of the silicon substrate and shaped into the meandering pattern shape.

16. The semiconductor integrated circuit for RF communication as recited in claim 9, wherein:

said first to fourth voltage dropping elements are made, using the metal wiring layers formed on the insulating layer on the surface of the silicon substrate and shaped into a spiral shape pattern.

17. The semiconductor integrated circuit for RF communication as recited in claim 10, wherein:

said first and second voltage dropping elements are made, using the metal wiring layers formed on the insulating layer on the surface of the silicon substrate and shaped into the spiral shape pattern.

18. The semiconductor integrated circuit for RF communication as recited in claim 14, wherein:

said metal wiring layers are aluminum wiring layers.

19. The semiconductor integrated circuit for RF communication as recited in claim 12, wherein:

said insulating layer is a SiO_2 layer.